

See discussions, stats, and author profiles for this publication at: <https://www.researchgate.net/publication/5816097>

Immunization in the Print Media—Perspectives Presented by the Press

Article in *Journal of Health Communication* · December 2007

DOI: 10.1080/10810730701672363 · Source: PubMed

CITATIONS

19

READS

87

5 authors, including:



Felicity Goodyear-Smith

University of Auckland

314 PUBLICATIONS 5,867 CITATIONS

[SEE PROFILE](#)



Helen Petousis-Harris

University of Auckland

81 PUBLICATIONS 1,146 CITATIONS

[SEE PROFILE](#)



Nikki Turner

University of Auckland

115 PUBLICATIONS 1,533 CITATIONS

[SEE PROFILE](#)

Some of the authors of this publication are also working on these related projects:

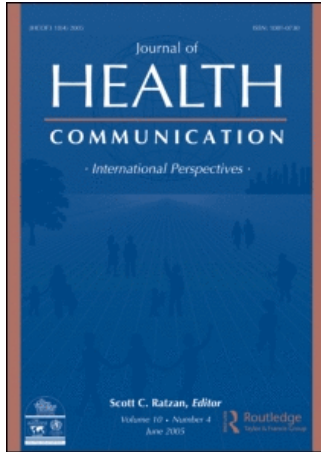


Effectiveness of pneumococcal conjugate vaccines in New Zealand [View project](#)



Doctoral Thesis: Evaluating the uptake and impact of HPV vaccination among New Zealand MSM [View project](#)

This article was downloaded by:[University of Auckland]
On: 20 November 2007
Access Details: [subscription number 778559109]
Publisher: Taylor & Francis
Informa Ltd Registered in England and Wales Registered Number: 1072954
Registered office: Mortimer House, 37-41 Mortimer Street, London W1T 3JH, UK



Journal of Health Communication International Perspectives

Publication details, including instructions for authors and subscription information:
<http://www.informaworld.com/smpp/title~content=t713666566>

Immunization in the Print Media - Perspectives Presented by the Press

Felicity Goodyear-Smith^a; Helen Petousis-Harris^a; Colleen Vanlaar^a; Nikki Turner^a; Stephen Ram^a

^a Department of General Practice and Primary Health Care, School of Population Health, University of Auckland, Auckland, New Zealand

Online Publication Date: 01 December 2007

To cite this Article: Goodyear-Smith, Felicity, Petousis-Harris, Helen, Vanlaar, Colleen, Turner, Nikki and Ram, Stephen (2007) 'Immunization in the Print Media - Perspectives Presented by the Press', Journal of Health Communication, 12:8, 759 -

770

To link to this article: DOI: 10.1080/10810730701672363

URL: <http://dx.doi.org/10.1080/10810730701672363>

PLEASE SCROLL DOWN FOR ARTICLE

Full terms and conditions of use: <http://www.informaworld.com/terms-and-conditions-of-access.pdf>

This article maybe used for research, teaching and private study purposes. Any substantial or systematic reproduction, re-distribution, re-selling, loan or sub-licensing, systematic supply or distribution in any form to anyone is expressly forbidden.

The publisher does not give any warranty express or implied or make any representation that the contents will be complete or accurate or up to date. The accuracy of any instructions, formulae and drug doses should be independently verified with primary sources. The publisher shall not be liable for any loss, actions, claims, proceedings, demand or costs or damages whatsoever or howsoever caused arising directly or indirectly in connection with or arising out of the use of this material.

Immunization in the Print Media—Perspectives Presented by the Press

FELICITY GOODYEAR-SMITH,
HELEN PETOUSIS-HARRIS, COLLEEN VANLAAR,
NIKKI TURNER, AND STEPHEN RAM

Department of General Practice and Primary Health Care, School of
Population Health, University of Auckland, Auckland, New Zealand

New Zealand (NZ) has low immunization coverage for a Western country. Media coverage, including views and content expressed on editorial pages, can affect immunization uptake both positively and negatively. The objectives of this research were to analyze the content of written media in 2001 and 2003 throughout NZ in terms of vaccination and vaccine preventable diseases from a supporting, neutral, or opposing perspective; how vaccination and vaccine-preventable diseases are presented to their target audiences; and changes over time with possible influences on these changes. Print media clippings were analyzed from 400 national publications in 2001 and 2003 for references to immunization and vaccine-preventable diseases. Articles were coded as supportive, neutral, or opposing immunization. During two 12-month periods, 2,113 articles, including letters to the editor and opinion columns were analyzed: 1,228 from 2001; and 885 from 2003. Thirty-three percent (704) were classified as “supportive,” 17% (362) as “opposing,” and 51% (1,081) as “neutral.” Articles and perspectives in the media opposed to immunization were significantly more plentiful in 2001 than in 2003 (328/1,228; 27% vs. 34/885; 4% of all immunization media; $\chi^2 = 189.46$; $p = < 0.0001$; $df = 1$). References to specific vaccines and disease were examined. During this study period there were high-profile infectious disease and vaccine issues that may have shaped the differences observed in the media clippings. This study indicates an overall positive trend toward reduction in alarmist anti-immunization messages in media. Strategies implemented by the Immunization Advisory Centre to counter misinformation may have contributed to reduction in anti-immunization messages.

The economic and societal costs of vaccine preventable disease are well documented. For example, in the United States, every dollar spent to purchase measles-containing vaccine saved \$10.30 in direct medical costs and \$3.20 in indirect societal costs (Public Health Agency of Canada, 1999). Dramatic declines in morbidity in NZ have been reported for the nine vaccine-preventable diseases for which vaccination is universally recommended for children. For example, as a direct result of immunization, NZ has been free of poliomyelitis for many decades.

New Zealand, however, has a sustained low immunization coverage rate. Most recent data indicate that fewer than 65% of NZ children are fully immunized at 2 years (Ministry of Health, 1992; North Health, 1996; Turner, Baker, Carr, & Mansoor, 2000). The resultant high disease rates of illnesses such as measles and

Address correspondence to Felicity Goodyear-Smith, Private Bag 92019, Auckland, New Zealand. E-mail: f.goodyear-smith@auckland.ac.nz

whooping cough place unnecessary financial burden on health resources (Grant et al., 2003). New Zealand now has a greater pertussis (whooping cough) disease burden than most other developed countries. Based on two decades of comparisons of *Bordetella pertussis* rates, NZ has had between five and 10 times as much pertussis as either the United Kingdom or the United States (Blakely, Mansoor, & Baker, 1999; Farizo et al., 1992; Guris et al., 1999; Reid & Graham Smith, 1984; Van Buynder et al., 1999).

Many factors contribute to reaching and maintaining high vaccine coverage. Success requires multifaceted approaches (Lister, McIntyre, Burgess, & O'Brien, 1999). Ultimately, it is the combined behavior of health professionals, parents, caregivers, and the wider community who determine the success of a childhood immunization program. This behavior is shaped by a number of environmental factors such as policy and legislation (Lawrence, MacIntyre, Hull, & McIntyre, 2004), education (Wroe, Turner, & Salkovskis, 2004), socioeconomic conditions (Ministry of Health, 1992), and by mass communication (Gangarosa et al., 1998).

Media activities can directly affect immunization uptake both positively and negatively (Danovaro-Holliday, Wood, & Le Baron, 2002). A recent Cochrane review concluded that mass media should be considered a tool that may encourage use of effective health services and discourage those of unproven effectiveness (Grilli, Ramsay, & Minozzi, 2005). The reach of the combined mainstream print media in NZ is wide, covering all homes in all regions at least once per week (including free regional newspapers), although they may not be read in every home. Media reports questioning vaccine safety may significantly increase parental concern (Mansoor, Sarfati, & Durham, 1998). Such media reporting often increases as disease prevalence declines and the focus changes from fear of disease to fear of vaccine safety (Leask, 2002).

In Wales there was extensive adverse coverage of the measles, mumps, rubella (MMR) vaccine in one local newspaper from June to September in 1997. Following this period there was a 13.6% decline in vaccine uptake in the distribution area of that publication, compared with a decline of only 2.4% elsewhere (Mason & Donnelly, 2000), illustrating the power of one local newspaper to influence the perceptions of a community. A challenge for national health organizations is therefore to respond to local and grassroots media campaigns opposing immunization. A possible strategy is a nationwide network of contacts within each region that monitors local immunization media coverage and provides responses to issues raised by local lobby groups opposed to immunization.

The objectives of our research were to analyze the content of written media reports (magazines and newspapers) in 2001 and 2003 throughout NZ with respect to the focus in terms of vaccination and vaccine-preventable diseases from a supporting, neutral, or opposing perspective. We also how vaccination and vaccine-preventable diseases are presented to their target audiences, what changes occur over time, and what are the possible influences on these changes.

Methods

The study analyzed NZ print media clippings from 400 different national publications for the years 2001 and 2003. The years were chosen because 2001 contained some important changes to the NZ immunization schedule and 2003 was the year the study was undertaken. These were obtained from a professional clipping agency

that inspects all national daily and weekly newspapers and nondaily suburban and provincial papers and magazines, including health-related publications, and provides copies of all articles mentioning the words immunize/immunization, vaccine/vaccinate, and the nine vaccine-preventable diseases in the childhood schedule (poliomyelitis, diphtheria, whooping cough/pertussis, tetanus, hemophilus influenza, Hepatitis B, measles/morbili, rubella, and mumps). Both data sets contained 12 consecutive months of media clippings. We analyzed articles, including letters to the editor and opinion columns, for their tone and content. While the word “article” is used throughout this study, it should be recognized that this includes letters and columns.

After initial reading of the material, discussions between three of the researchers determined that articles would be coded according to their perspective—whether the article was “supportive,” “neutral” (containing only informative information and did not expressing any stance on immunization), or “opposed” to immunization. Articles then were categorized and coded by one researcher and entered in a database. Fields included date, type, and region of media source; the vaccine(s) and disease(s) referred to; mention of disease epidemics or adverse events as a result of vaccines; and the “perspective” code. To assess reliability, 20 randomly selected articles were submitted, along with guidelines of the categorization and coding, to a blinded independent reviewer. Critical assessment and checking confirmed complete agreement.

Some ($n = 26$) articles from the 2003 period had no attached date or source. These were included for analysis of the total sample set, and in analysis of the 2003 time period, but were not included in analysis regarding region, type of media, or date.

Details were entered into an Excel spreadsheet and converted into an Access database for analysis. Queries were made to find links, proportions, and statistics. Epi-Info was used to find p values and to check for the significance of results when making comparisons.

Results

A total of 2,113 articles, including letters to the editor and content expressed on editorial pages, from 12-month periods were included in the analysis: 1,228 from 2001 and 885 from 2003.

Supportive, Neutral, and Opposing Views and Their Thematic Focus

Of these 2,113 clippings, 33% (704) were classified as “supportive,” 17% (362) as “opposing,” and 51% (1,081) as “neutral.”

Although the region of Northland has only 3.7% (140,133) of the national population, 20% of all media opposed to immunization and 13% of immunization media overall originated in this region. This anti-immunization material was attributed to a very small number of authors.

Media opposed to immunization was markedly higher in 2001 than in 2003 (328/1,228; 27% vs. 34/885; 4% of all immunization media; $\chi^2 = 189.46$; $p = < 0.0001$; $df = 1$). Sixty-six percent (240/362) of all these clippings were letters to the editor and expressed the opinion of an individual or organization. These often

were repeated and circulated through several local newspapers throughout the country. Additionally, these 240 articles were written by the same small group of authors who regularly wrote to newspapers and evoked responses from a wider network of authors from around the country.

Anti-immunization media was dominated by opinion in 2001 (225/338; 67%). In 2003 there was a significant decrease to 44% of all opposing media (15/34; $\chi^2 = 8.26$; $p = < 0.004$; $df = 1$).

Media opposing immunization was present most often in local (294, 81%) rather than national publications (9, 2.5%; $\chi^2 = 461/00$; $p = < 0.0001$; $df = 1$). Anti-immunization media was markedly lower, although not absent, in medical publications (7/117; 6%). Articles mentioning Māori or Pacific People also had a low number of opposing views toward immunization (9/112, 8%) compared with the 17% anti-immunization articles across the whole sample ($\chi^2 = 5.72$; $p = < 0.0168$; $df = 1$).

Anti-immunization media regarding the MMR vaccine was more prominent in 2001 than in 2003, with 201 articles in 2001 but only 12 in 2003 ($\chi^2 = 110.39$; $p = < 0.0001$; $df = 1$). Influenza and meningococcal vaccines also were commonly mentioned vaccines among anti-immunization media. These were both more commonly mentioned in 2001 than in 2003 following the same pattern of decrease as the MMR vaccine.

Articles Mentioning Adverse Events Following Immunization and Their Stance Toward Immunization

Adverse events to vaccines were referred to in 501 articles. Of the total 362 articles, which were classified as media opposing immunization, 264 articles (73%) mentioned adverse events, with 179 of these concerned with adverse events to the MMR vaccine. The influenza vaccine and the diphtheria, tetanus and acellular pertussis (DTaP) vaccines also commonly were mentioned with regard to adverse events in anti-immunization media. In 44 anti-immunization articles (69% of "anti-immunization" material), adverse events were mentioned without mentioning a vaccine. In these articles adverse events often were described using emotive language and described tragic personal stories. Very seldom were they backed up by scientific evidence; more often they were accompanied by anecdotal support.

Media Supportive of Immunization

Media supportive of immunization contributed to 33% (704/2,113) of total media for the sample period. This proportion stayed consistent between 2001 (35%) and 2003 (31%, $\chi^2 = 2.49$; $p = < 0.1147$; $df = 1$), thus the proportion of proimmunization was significantly higher than that of anti-immunization media in the total sample period (33% vs. 17%; $\chi^2 = 146.74$; $p = < 0.0001$; $df = 1$). Most of this media was present in informative rather than in opinion-based articles in both 2001 and 2003. This contrasted with the anti-immunization media, which were mostly in opinion-based sources such as letters to the editor, viewpoints, and editorials.

Supportive media was under-represented in letters to the editor (98/387, 25%), which were dominated by anti-immunization items (222/387, 57%) and did not follow the overall trend of having more pro- than anti-immunization media. There was a decrease in proimmunization media in the national newspapers from 33% in 2001

to only 9% in 2003. This was a substantial decrease ($\chi^2 = 17.4$; $p = < 0.0001$; $df = 1$), shifting to neutral presentations in 2003. Medical publications and articles mentioning Māori or Pacific People appeared to have higher proportions of pro-immunization media than the overall trend.

Changes Over Time: Differences in Focus Between 2001 and 2003

The diseases and vaccines in focus were different for each year. MMR was mentioned in 23% (480) of all articles in the total sample period. The majority of these were in 2001, where 444 articles mentioned MMR compared with only 36 in 2003. Measles disease followed the same pattern and was mentioned in 17% of all articles in the sample period: 332 articles in 2001 and only 33 in 2003. In 2001, MMR was almost equally associated with proimmunization and anti-immunization media. This changed in 2003, when the proportion of anti-immunization media decreased (and the proportion of proimmunization media increased significantly).

Pertussis was a common disease concern in 2001 and 2003, appearing in 10% of all disease concern articles for both periods. Overall, the media surrounding DTaP and pertussis was more often proimmunization than anti-immunization. There appeared to be a higher proportion of anti-immunization media regarding the vaccine in 2001 than in 2003 (23% vs 10%), but this was not highly significant ($\chi^2 = 3.36$; $p = < 0.067$; $df = 1$).

Discussion

Articles and perspectives in the media opposed to immunization were significantly higher in 2001 than 2003. There are a number of possible reasons for this. The majority (73%) of anti-immunization media tended to focus on adverse events, tended to be found in letters to the editor, made emotive appeal and cited tragic personal stories, and did not tend to refer to specific vaccines, with the exception of MMR in 2001. Waning media and public interest in MMR may explain this decrease. In contrast, proimmunization media tended to be informative rather than opinion based and was found in a greater proportion of Maori (indigenous) and Pacific populations (two important ethnic minorities in NZ society). Although both pro- and anti-immunization articles mentioned pertussis and MMR vaccines in 2001 and 2003, there was a trend (of limited statistical significance) toward more articles supportive of these vaccines in 2003 as opposed to in 2001.

Perhaps the phenomenon that poses the greatest growing threat to controlling vaccine preventable diseases is the ability of the disparate groups of the anti-immunization movement to communicate increasingly more widely and rapidly through the growth of the Internet and other mass media. This serves to amplify their influence beyond justification. These groups and the doubts they generate in the minds of both caregivers and health professionals are becoming a major issue for vaccine providers such as family physicians (Petousis-Harris, Goodyear-Smith, Turner, & Soe, 2004). The public health consequences of these media activities can be dramatic. Where there is either mass promotion or scaremongering, immunization coverage is affected accordingly (Gangarosa et al., 1998). For example, the effects of anti-immunization movements on pertussis epidemics in several countries have been well documented. In countries where vaccination had been interrupted by anti-immunization

movements and negative press, there have been outbreaks of pertussis (Gangarosa et al., 1998).

Low immunization rates have been attributed partly to a decline in disease rates, serving as a lack of reminder to parents to immunize their children (Leask 2002). Parents may have little knowledge of the disease or the vaccine and be swayed easily by anti-immunization messages in the media. NZ research has identified that parental knowledge of vaccination and the diseases that vaccines protect against is an important determinant in the decision to vaccinate their child (Petousis-Harris, Goodyear-Smith, Godinet, & Turner, 2002; Petousis-Harris, Turner, & Kerse, 2002; Wroe et al., 2004). Additionally, a study of NZ mothers' attitudes toward immunization suggested that fear of adverse events was a common theme amongst those parents who chose not to vaccinate their children (Petousis-Harris et al., 2002). The large number of anti-immunization articles that mentioned adverse events in 2001 may have contributed to such anxiety about adverse events associated with immunization.

In NZ there have been recent initiatives to promote vaccination as an effective way to prevent infectious disease in the print media. For example, the University of Auckland runs a communication strategy called the Immunization Advisory Centre (IMAC), developed progressively over the past 6 years, that implements both proactive and reactive strategies to deal with the media's coverage of disease and immunization. Proactive strategies include a communications team who builds relationships between experts within IMAC and the media, and contributes to articles around vaccine-preventable diseases (e.g., yearly articles about influenza immunization at the beginning of the annual influenza immunization campaigns). Reactive strategies include sending rebuttals addressing key letters to the editor that express anti-immunization sentiment and being involved in televised debates on immunization. In June 2002 the Ministry of Health Director of Public Health, Dr. Colin Tukuitonga, issued a directive to health professionals to cease handing out anti-immunization material to expectant mothers because it could endanger the health of babies. The resulting media attention gave rise to increased public and professional awareness about immunization issues and misconceptions (Topham-Kindley, 2003).

As noted in the literature, the media have a significant effect on public perception of disease and vaccination, ultimately leading to changes in vaccine coverage. During this study period there were high-profile infectious disease and vaccine issues that may have shaped the differences observed in the media clippings.

Vaccine Awareness Issues

MMR

A school mass immunization program for MMR was launched in 2001 in an attempt to prevent a predicted epidemic. A media campaign was started in June 2001, with immunization beginning in schools in July. This ran throughout the year in schools nationwide and appeared to spark a high number of articles on both the MMR vaccine and measles as a disease.

The source of the controversy surrounding the MMR vaccine's alleged link to autism and Crohn's disease was published in 1998 (Wakefield et al., 1998). References to this continued to appear in the media in 2001. A high proportion of letters to the editor and a substantial proportion of informative articles included this

research as a reference in anti-immunization articles, although any causal relationship between MMR and autism or Cohn's disease repeatedly has been disproved (Institute of Medicine, 2001; Makela, Nuorti, & Peltola, 2002). By 2003 reporting had dropped away.

Schedule Change for Polio, Pertussis, Diphtheria, and Tetanus Vaccines

A planned change to the national immunization schedule in February 2002 and announced in 2001 affected the timing and delivery of the childhood vaccines. Furthermore, there was a rapid change in formulation of the DTP vaccine in August 2001, quite precipitously owing to vaccine supply problems.

Pertussis Epidemic

The pertussis epidemic of 1999–2001 peaked at the end of 2000/beginning of 2001. The clippings for 2001 were taken during this epidemic and contain high media coverage of pertussis. Initiatives to increase pertussis awareness were part of a national well-child campaign in 2001 and promotion occurred throughout the next 2 years. This is reflected in the media, with a high coverage of pertussis and a high number of disease concern articles in both 2001 and 2003. A graphic pertussis television advertisement, which screened in 2001, also may have contributed to media coverage of the disease.

This study indicates overall a positive trend toward reduction in alarmist anti-immunization messages in NZ media. Strategies by bodies such as IMAC and the Ministry of Health may have contributed to this improvement, although the lack of national immunization coverage data for 2001–2003 and the absence of research into current parental attitudes on immunization (in 2003) makes it difficult to verify this. Further research into possible changes in parental attitude toward immunization during this time also would provide helpful information about the success of such organizations' media strategies.

The decrease in MMR and measles in the media appeared to be correlated with the decrease in the letters to the editor and anti-immunization media, as a high proportion of each of these was about MMR. The international decline in the concerns around autism and Crohn's disease over this time may be a major reason for this.

An Australian study showed that only 4.7% of media opposed immunization (Leask, 1998), while our study found 27% of print-media coverage was anti-immunization in 2001. This had reduced to a similar rate as Australia (4%) in 2003.

It is of interest that the style of anti-immunization media has shifted from less opinion-style to more information-style articles in 2003. Whether this is a reflection on a deliberately different angle from this lobby, or just a change in the main players, is unclear. The opposing media clearly is dominated by very few active proponents. The main target of the lobby is the topic of vaccine events. It is salient to note that overall two out of three articles around vaccine events did not highlight any specific vaccine but generalized events to all vaccines.

Limitations of this study include its restricted scope to print media, given the wider accessibility to the NZ population of television and radio, as well as the lack of national immunization coverage data available at the time the study was undertaken to provide any quantitative estimation of the effect of the communications

media content and focus on demand for immunization. Quantitative findings have not clearly elucidated distinctions among anti-immunization media, media supportive of immunization, and media neutral in stance toward immunization.

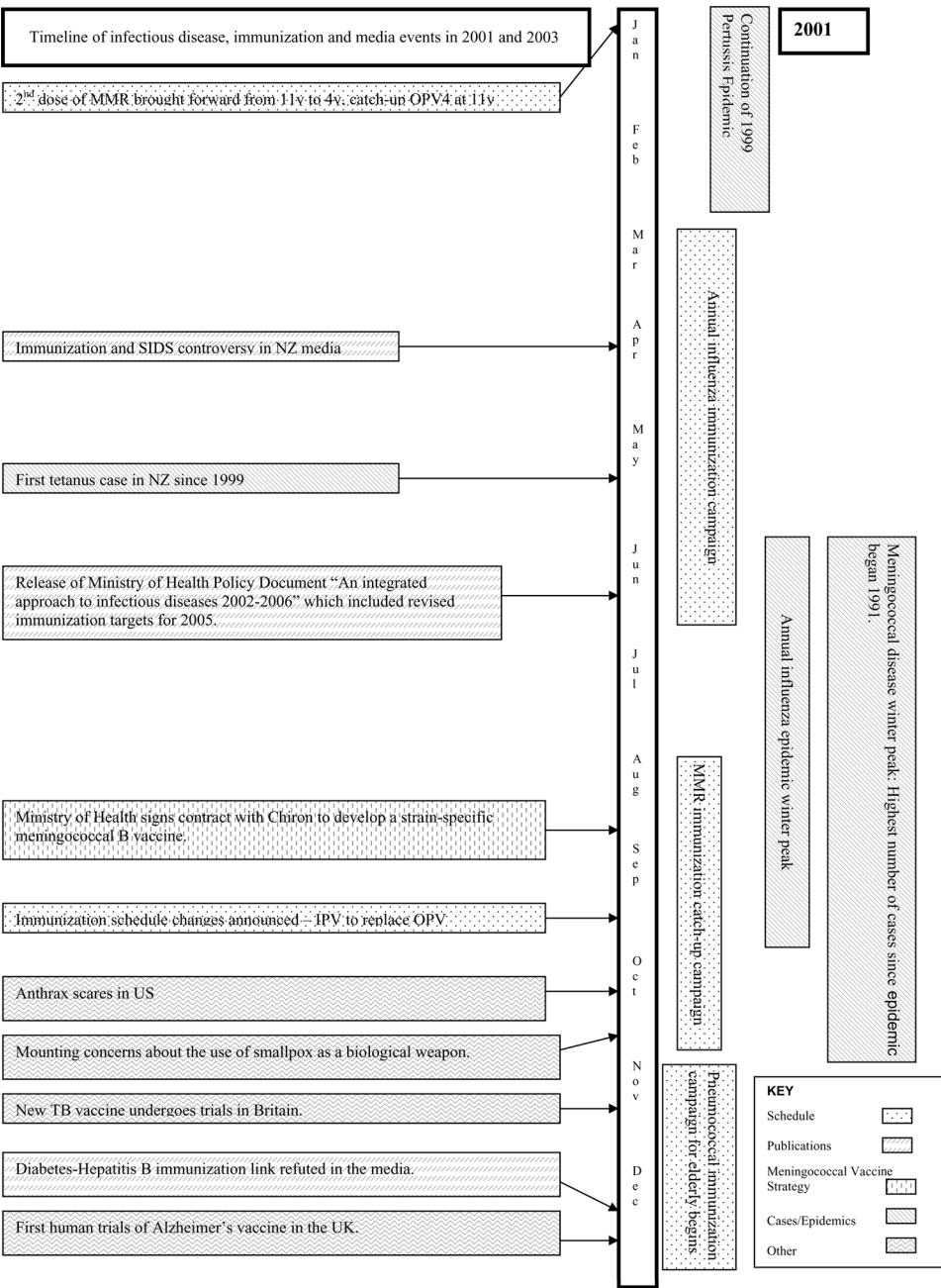


Figure 1. Timeline of infectious disease, immunization and media events in 2001 and 2003.

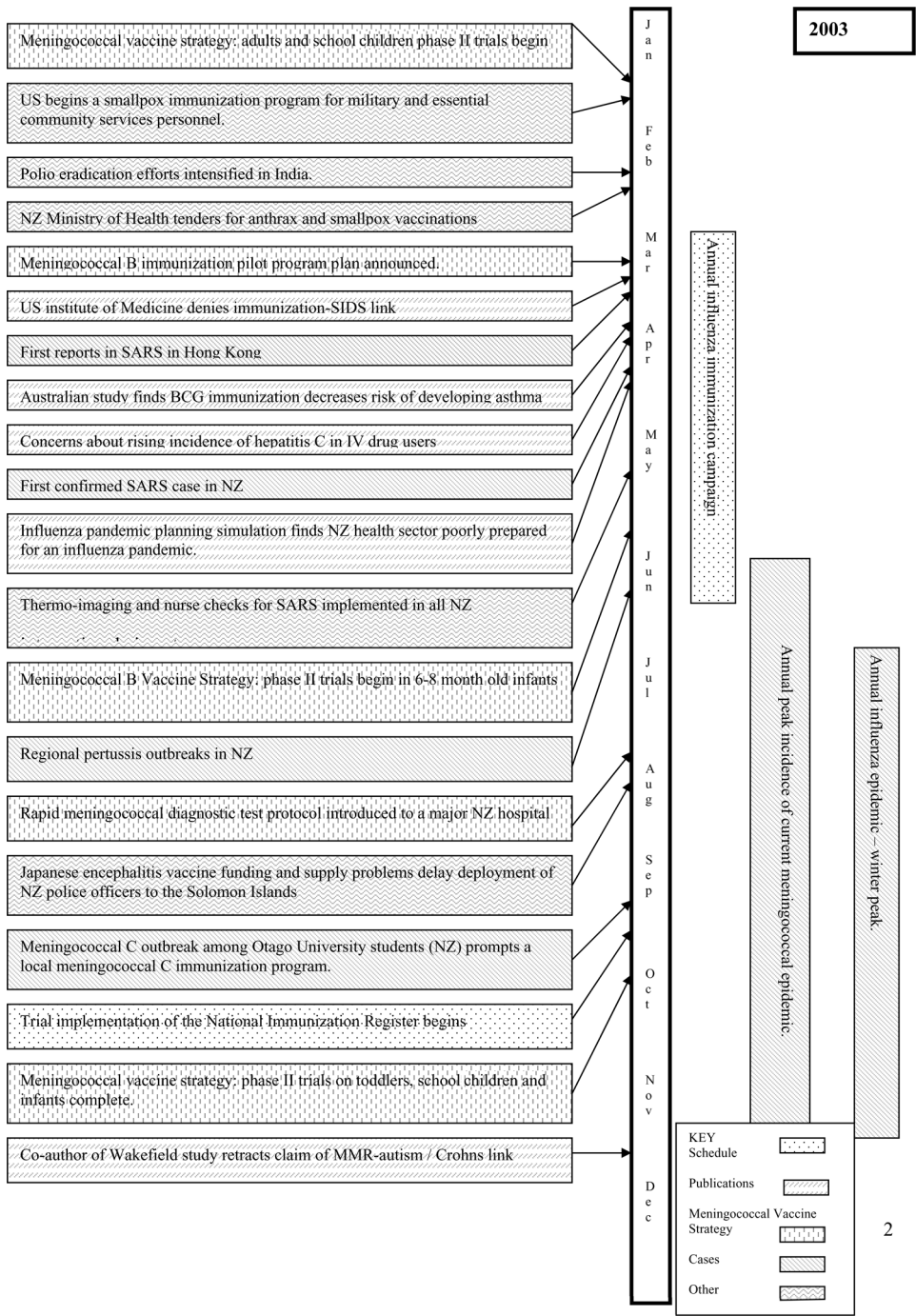


Figure 1. Continued

Further studies using quantitative methods to examine article discourse may provide clearer information on these distinctions.

Implications

To maintain public confidence, health planners constantly need to develop and review their health promotional messages and relationships with the media. Raising awareness of infectious diseases may be helpful in shifting the emphasis away from vaccine safety concerns. Effective responses to anti-immunization messages also may be important, and consideration needs to be applied to appropriate strategies. As observed by Leask (2002), anti-immunization claims frequently are introduced by health professionals attempting to refute them, risking amplification of public awareness of anti-immunization arguments. It was suggested that health professionals not respond defensively by repeating the anti-immunization arguments. Within that article there are examples of responding effectively to anti-immunization sentiment without inadvertently furthering its cause. For example, given that anti-vaccination articles use emotive language and tragic personal story, a possible strategy for promoting immunization may involve equally tragic accounts of those who contract vaccine-preventable diseases.

This study indicates a large proportion of letters to the editor is from individuals opposed to immunization. A possible strategy for immunization promotion may include increasing the proportion of letters to the editor supportive of immunization, including both rebuttals to articles and letters opposing immunization as well as letters supportive of immunization in response to articles written with a “neutral” stance toward immunization.

Whether the reduction in anti-immunization messages is sustainable in an environment where little disease is present or relies on reminders of disease remains to be seen. If there is little media attention to vaccine-preventable diseases, the general fear of alleged vaccine events appears to become more prominent.

The media strategies that have been built over the past few years in NZ by IMAC and the Ministry of Health to deal with the media include providing them with a few key accessible, media trained personnel who can talk on a wide range of immunization issues. All issues posed by the media are taken seriously and responded to immediately. Local journalists have come to know these key people and use them as a first point of contact when any new issues arise. Several front-page alarmist negative stories such as results of a dubious study on the relationship between MMR vaccine and autism (Geier & Geier, 2003) were prevented by this strategy when journalists allowed the key personnel to follow up rapidly on the new information prior to going to press. Strategies such as this have been recommended during a workshop in vaccination and risk communication in Virginia (Leask, 2002), highlighting the importance of meeting the needs of the media. These strategies may have contributed to the significant decrease in media coverage, in particular negative, between 2001 and 2003.

While there is a financial cost to vaccinating vulnerable populations against preventable disease, the resulting reduction in morbidity and mortality has overwhelming financial and human welfare gains. To achieve adequate immunization coverage rates, it is important that the population, both the public and health professionals, have confidence in the safety of vaccines and appreciate the importance of providing

prevention against these diseases. The print media plays an important role in public awareness and education with respect to these issues.

References

- Blakely, T., Mansoor, O., & Baker, M. (1999). The 1996 pertussis epidemic in New Zealand: Descriptive epidemiology. *New Zealand Medical Journal*, 112(1081), 30–33.
- Danovaro-Holliday, M. C., Wood, A. L., & LeBaron, C. W. (2002). Rotavirus vaccine and the news media, 1987–2001. *Journal of American Medical Association*, 287(11), 1455–1462.
- Farizo, K. M., Cochi, S. L., Zell, E. R., Brink, E. W., Wassilak, S. G., & Patriarca, P. A. (1992). Epidemiological features of pertussis in the United States, 1980–1989. *Clinical Infectious Diseases*, 14(3), 708–719.
- Gangarosa, E., Galazka, A., Wolfe, C., Phillips, L., Gangarosa, R., Miller, E., et al. (1998). Impact of anti-vaccine movements on pertussis control: The untold story. *The Lancet*, 351(January 31), 356–360.
- Geier, M. R. & Geier, D. D. (2003). Pediatric MMR vaccination safety. *International Pediatrics*, 18(2), 108–113.
- Grant, C., Scragg, R., Lennon, D., Ford, R., Stewart, J., Menzies, R. et al. (2003). Delayed immunisation and risk of pertussis in infants: Unmatched case-control study. *BMJ*, 326(7394), 852–853.
- Grilli, R., Ramsay, C., & Minozzi, S. (2005). Mass media interventions: Systematic review. *Cochrane Database of Systematic Reviews*, 1, 1–27.
- Guris, D., Strebel, P. M., Bardenheier, B., Brennan, M., Tachdjian, R., Finch, E., et al. (1999). Changing epidemiology of pertussis in the United States: Increasing reported incidence among adolescents and adults, 1990–1996. *Clinical Infectious Diseases*, 28(6), 1230–1237.
- Institute of Medicine. (2001). *Epidemiologic studies of MMR vaccine and autism*. Washington: 1–63.
- Lawrence, G. L., MacIntyre, C. R., Hull, B. P., & McIntyre, P. B. (2004). Effectiveness of the linkage of child care and maternity payments to childhood immunisation. *Vaccine*, 22, 2345–2350.
- Leask, J. (1998). An attempt to swindle nature: Press anti-immunisation reportage 1993–1997. *Australian and New Zealand Journal of Public Health*, 22(1), 17–26.
- Leask, J. (2002). Vaccination and risk communication: summary of a workshop, Arlington Virginia, USA, 5–6 October 2000. *Journal of Paediatrics and Public Health*, 38(2), 124–128.
- Lister, S., McIntyre, P. B., Burgess, M. A., & O'Brien, E. D. (1999). Immunisation coverage in Australian children: A systematic review 1990–1998. *Communicable Diseases Intelligence*, 23(6), 145–170.
- Makela, A., Nuorti, J. P., & Peltola, H. (2002). Neurologic disorders after measles-mumps-rubella vaccination. *Pediatrics*, 110(5), 957–963.
- Mansoor, O., Sarfati, D., & Durham, G. (1998). Is confidence in immunisation declining? *New Zealand Medical Journal*, 111(1071), 300.
- Mason, B. W. & Donnelly, P. D. (2000). Impact of a local newspaper campaign on the uptake of the measles mumps and rubella vaccine. *Journal of Epidemiology & Community Health*, 54(6), 473–474.
- Ministry of Health. (1992). *Immunisation coverage in New Zealand: Results of the regional immunisation coverage surveys*. Wellington: Author.
- North Health. (1996). *Immunisation coverage survey: Summary of the final report*. Auckland: Author.
- Petousis-Harris, H., Goodyear-Smith, F., Godinet, S., & Turner, N. (2002). Barriers to childhood immunisation among New Zealand mothers. *New Zealand Family Physician*, 29(6), 396–401.

- Petousis-Harris, H., Goodyear-Smith, F., Turner, N., & Soe, B. (2004). Family physician perspectives on barriers to childhood immunisation. *Vaccine*, 22(17–18), 2340–2344.
- Petousis-Harris, H., Turner, N., & Kerse, N. (2002). Knowledge and attitudes of New Zealand mothers about immunisation. *New Zealand Family Physician*, 29, 240–246.
- Public Health Agency of Canada. (1999). Impact of vaccines universally recommended for children United States, 1990–999. *Canada Communicable Disease Report*, 25, 122–127.
- Reid, J. S. & Graham Smith, H. J. (1984). Childhood immunisations: A recall system is worthwhile. *New Zealand Medical Journal*, 97(765), 688–689.
- Topham-Kindley, L. (2003, July). Tukuitoranga staunch on anti immunisation. *New Zealand Doctor*, 3,4.
- Turner, N., Baker, M., Carr, J., & Mansoor, O. (2000). Improving immunisation coverage: What needs to be done. *New Zealand Public Health Report*, 7(3/4), 11–14.
- Van Buynder, P. G., Owen, D., Vurdien, J. E., Andrews, N. J., Matthews, R. C., & Miller, E. (1999). Bordetella pertussis surveillance in England and Wales: 1995–7. *Epidemiology & Infection*, 123(3), 403–411.
- Wakefield, A. J., Murch, S. H., Anthony, A., Linnell, J., Casson, D. M., Malik, M., et al. (1998). Ileal-lymphoid-nodular hyperplasia, non-specific colitis, and pervasive developmental disorder in children. *Lancet*, 351(9103), 637–641.
- Wroe, A. L., Turner, N., & Salkovskis, P. M. (2004). Understanding and predicting parental decisions about early childhood immunizations. *Health Psychology*, 23(1), 33–41.